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Agricultural Experiment Station
MORGANTOWN, W. VA.
DEPARTMENT OF FARM MANAGEMENT

AN AGRICULTURAL SURVEY
OF
BROOKE COUNTY

BY
O. M. JOHNSON and A. J. DADISMAN

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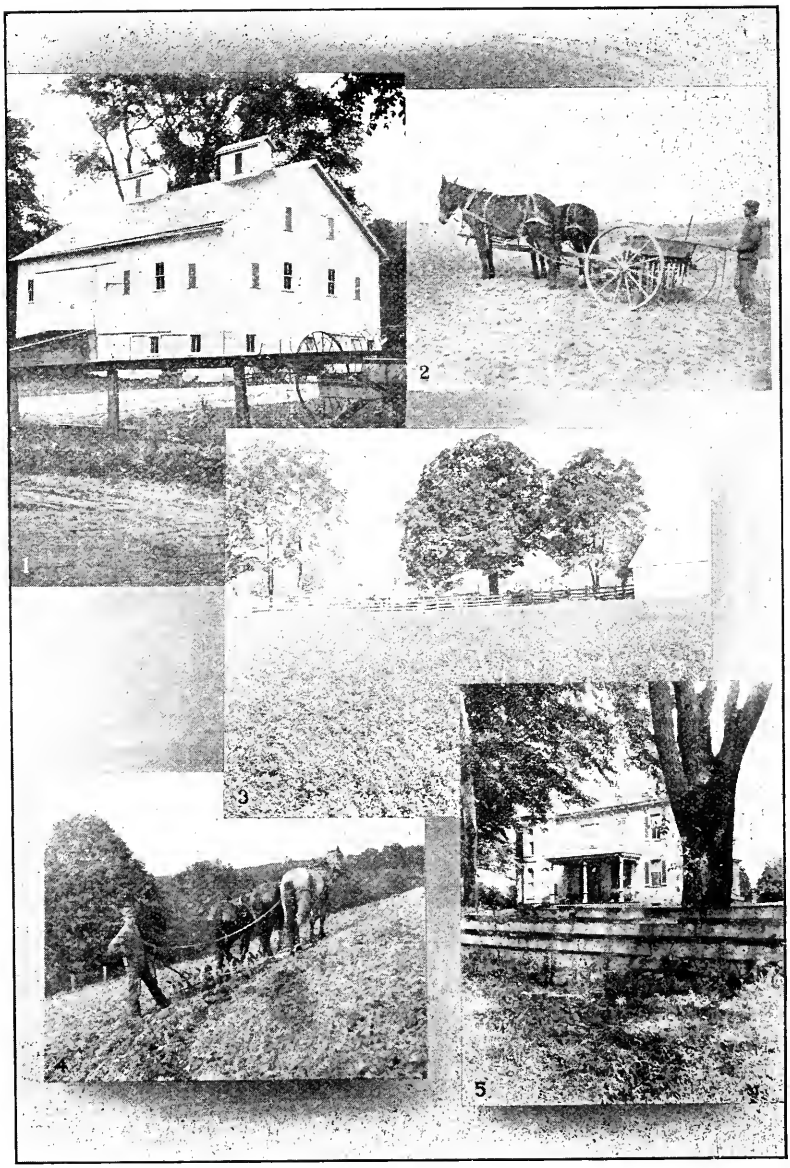


1—A well built barn. 2—Planting soybeans. 3—An alfalfa field. 4—Preparing land for alfalfa. 5—There are many good brick houses in Brooke County built fifty or more years ago.

An Agricultural Survey of Brooke County

By O. M. JOHNSON and A. J. DADISMAN.

INTRODUCTION.

The agriculture of any region is generally recognized as one of the important industries. The continuous success of this industry will depend in large measure upon the class of people that is attracted to it in the future. The attractions of any occupation are both social and economic but the fundamental importance of good economic conditions is not likely to be over estimated. If farming is to attract the young men of the country it must yield profits sufficient to justify their staying on the farms. Various industrial developments in the state have brought opportunities for ambitious young men, however agriculture offers a comfortable living to more people than do most other lines of endeavor.

The 1910 census figures show that 62.2 percent of the land area of West Virginia is in farms About one-third of the state is in timber land; this area is largely mountainous. A large part of the state is made up of broad rolling hills more suited to grazing than to cultivation but there are many fertile valleys among the hills which make up the best agricultural lands of the state. The mineral wealth has had a great influence on agriculture in much of the state. The industrial development during the last fifty years has given many farm owners an income sufficient to reduce the incentive to work their farms. The great diversity of conditions in the state brings about many farm management problems.

Farm management treats of the business of farming with a view to making the farm return the greatest continuous profits. The purpose of the Brooke County farm management survey was to determine the most profitable types of farming, the status of agricultural production, and the methods of farm management now practiced in this region. If a farm is to be a business success it must pay farm expenses, interest on the investment and wages for all farm labor. The successful farms are found to have one or more enterprises which are

conducted in such a way as to yield a good profit. These profitable enterprises, however, are not the same on all farms of the region but the combination of enterprises must be organized so as to meet the individual needs of each farm.

HOW THE SURVEY WAS MADE.

In the summer of 1914 the Office of Farm Management, of the Bureau of Plant Industry, United States Department of Agriculture, co-operating with the West Virginia Agricultural Experiment Station and the Pan Handle Agricultural Club made a farm management survey of Brooke County, West Virginia. Agricultural conditions were practically normal in the county that year, except that the fruit failed. This county was selected for the survey because it is typical of the northern part of the state and the interest of the Pan Handle Agricultural Club,* an organization of the farmers in the county, was such as to make the work immediately useful.

A circular letter explaining the survey was sent to each farmer for the purpose of acquainting him with the work. Each farmer was visited at his farm and asked questions from a blank provided for the purpose. The survey was made by the writers and Professor A. C. Workman. Farmers were universally courteous, and cheerfully answered all questions in so far as they could.

Calculating Results. All field blanks were checked and copied by the men who took the records. They were then checked by the man in charge of the field party and again checked in the office at Washington. When there was any doubt as to the accuracy of the record the farmer was visited the second time or additional information was obtained by mail. The results of this survey are compiled from the records of 201 farms.

*Much valuable assistance was rendered by Professor A. C. Workman, a representative of the Pan Handle Agricultural Club, in collecting the data. Acknowledgement is also due the farmers of Brooke County who made this study possible by their interest and cooperation.

EXPLANATION OF TERMS USED IN THIS REPORT.

In order that the terms used in this discussion may be clear, the ones which might not be understood are explained below. Familiarity with these terms will aid in interpreting the results given.

The Operator is the person who plans and manages the operations of the farm. He may be either the owner or tenant.

The Landlord is the person who owns the farm and leases it to another.

The Tenant is the person who operates a farm which is leased from another person.

An Inventory is a list of all farm property on hand with values assigned.

Capital is the amount of money invested in land, buildings, machinery, stock, supplies and cash for general farm expenses. An average of the values at the beginning and the end of the year is the capital for the year.

Farm Receipts include all returns from sales of crops, stock and stock products, from labor and other miscellaneous sources, and from the increase in inventory.

Farm Expenses include all sums paid out for the support of the farm business such as stock, feed, repairs, improvements, machinery, taxes, etc., and any decrease in inventory.

Farm Income is the difference between the farm receipts and expenses. It is the amount that the farmer and his capital earn.

Labor Income is the amount which the farmer receives for his labor and managing ability. It is found by deducting interest at 5 percent on the capital, from the farm income. In addition to the labor income the farm furnishes a house to live in and farm products such as meat, butter, eggs, vegetables and flour for home use.

Crop Index is a number used for comparing the yields of crops grown on a given farm with the average yield of the region. The average yield is represented by 100.

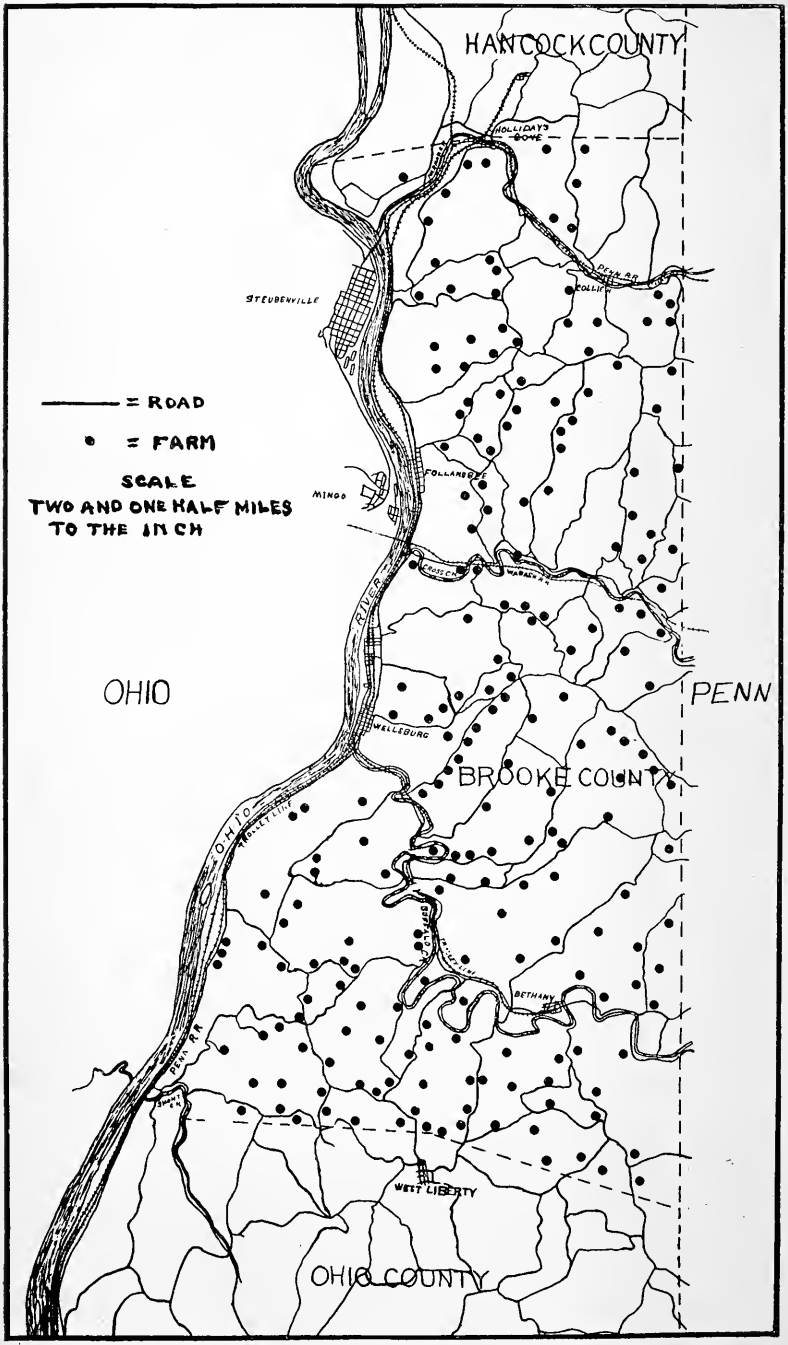
A Labor Unit for a horse or man represents approximately an average day's work.

An Animal Unit represents one horse, cow or the equivalent in other stock, based upon the amount of feed eaten.

A Farm includes all the land operated by one man. It may be owned, rented, or partly owned and the remainder rented. Usually the land is in one tract but it may be in two or more.

Family Income is the sum of the farm income and the value of the family labor.

Man Equivalent represents the number of men that would be required to do the work of the farm, if they work the entire year. The work is not distributed over the entire year, much more of it is done in some months than in others. The farmer's time is considered as twelve months.



Map showing location of Brooke County, distribution of farms surveyed, roads, streams and towns.

DESCRIPTION OF BROOKE COUNTY.

Brooke County, West Virginia, is in what is known as the Northern Pan Handle of the state. The county has an area of 87 square miles and a population of about 11,100. The land is generally rolling to hilly and intersected by many ravines. There are narrow bottoms at intervals along the Ohio River but much of the river is bordered by steep hills. There is but very little bottom land along the smaller streams. This county is part of an ancient upland plain which has been dissected by ages of erosion. In some parts of the county there are small areas of coal and petroleum. Practically all of the original forests have been removed and the land which is not too steep is being cultivated or used for pasture.

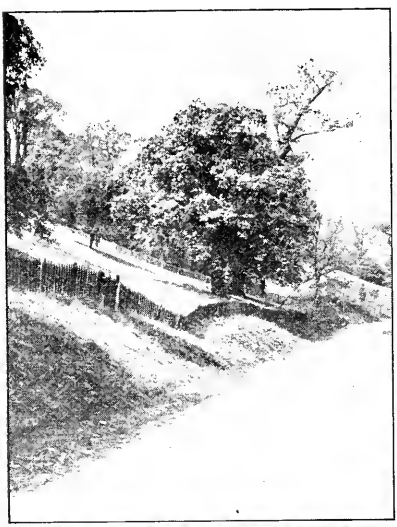
The climate is well suited to carrying on general farming. The average date of the last killing frost in spring is about April 11, and the first in the fall about October 26th, thus the growing season is approximately 200 days. The average annual rainfall is almost 40 inches, more than a proportional part of which falls in June and July.

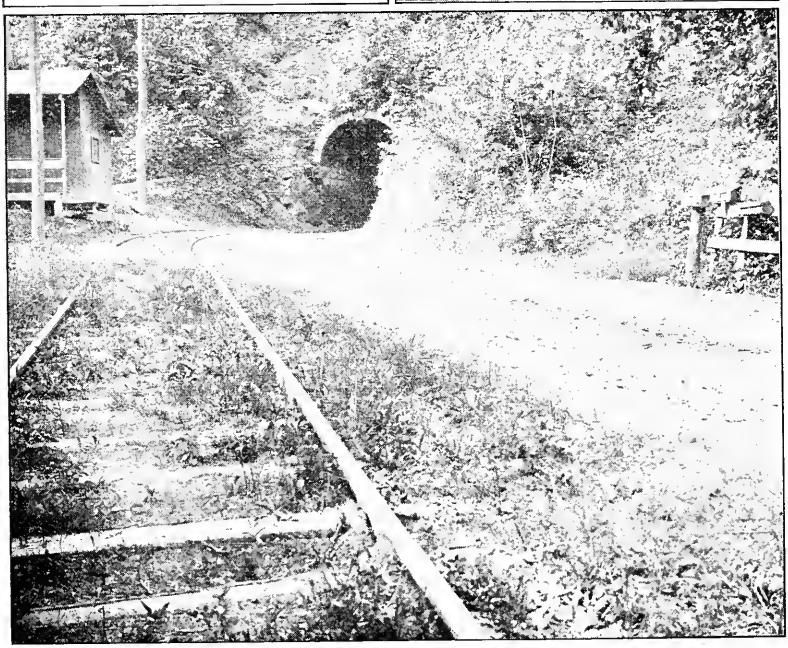
The soil of 95 percent of the county is a clay loam. Along the steams there is some rough stony land which can hardly be called a soil type.

The chief crops are corn, oats, wheat, rye, hay and truck crops. On some farms fruit growing is of considerable importance. Sheep and dairy cattle are the chief livestock grown.

The principal towns are Wellsburg and Follansbee, the population of the two numbering about 7,000. Wheeling and Steubenville, nearby cities having a combined population of nearly 70,000, afford good markets.

The shipping facilities afforded by the Ohio River, Pennsylvania and Wabash Railroads, and trolley lines, are very good. The county borders the Ohio River along which extends the Pennsylvania Railroad and a trolley line. The Pennsylvania Railroad also crosses the northern part of the county and the Wabash crosses it near the middle. Another trolley line extends almost across the southern part of the county. All these roads carry both passengers and freight. The county roads have been but little improved, they are very muddy in winter but very good in summer. There is a macadamized road across the middle of the county and some other roads are being built.



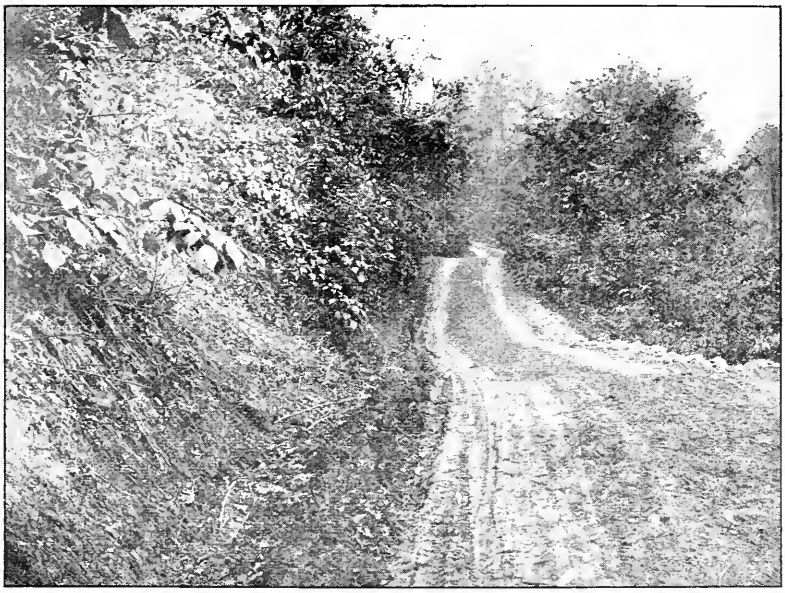


1—A well graded road. 2—Using an auto truck for hauling supplies to the country. 3—A tunnel built fifty years ago to shorten a country road; now used by a trolley line also.

STATISTICS FOR BROOKE COUNTY, 1850-1910.

Since no changes in the boundaries of the county have been made since 1848 when Hancock County was formed, the census reports show the progress of the county beginning with 1850.

Population, Improved Land and Value of Farms. The increase in population has been much more noticeable during



A steep hill road.

the past twenty years, during which time towns have grown rapidly. While the population of many of these is classed as rural, the interests are almost entirely in other industries. The growth and change in population will influence the agriculture in the future.

It seems probable that some of the changes in the area of improved land must be due to some confusion as to the classification used by the census enumerators at different times. There is no tendency to increase the amount of land under cultivation.

The high point in the value of farm property, reached in 1870, was due to the inflated condition of currency, but the rise has been very marked in the past decade. It is possible

that the new land cleared during the period 1860 to 1870 may have increased the value per acre.

Population, Improved Land and Value of Farms.

Census year	Population	Acres of improved land	Value of land and buildings
1850	4,954	33,811	$1,279,368
1860	5,443	41,099	2,447,903
1870	5,367	54,856	3,548,075
1880	6,013	35,642	2,941,124
1890	6,660	44,582	2,575,840
1900	7,219	44,792	2,272,030
1910	11,098	36,977	3,050,920

Crop Production. The annual production of no staple crop was as large in 1910 as had been reported for some former census. Hay is the only crop showing a marked increase over 1850.

Crop Production—1850-1910.

Census year	Corn (Bushels)	Oats (Bushels)	Wheat (Bushels)	Hay (Tons)
1850	150,571	51,729	65,516	4,755
1860	142,129	64,940	23,490	5,445
1870	185,576	81,135	45,559	7,570
1880	162,809	61,390	62,623	6,180
1890	137,354	86,750	49,057	8,606
1900	164,560	74,340	40,600	8,611
1910	153,560	60,255	20,758	8,139

Livestock Production. Two noteworthy changes have come about in this branch of farming. There are about one-fourth as many sheep in the county as there were in 1850 and about twice as many dairy cows. About the same number of horses is found on farms now as during the earlier periods. Hogs have decreased in number since 1890. The total value of all livestock has risen steadily since 1880.

Livestock—1850-1910.

Census year	Number of dairy cows	Number of other cattle	Number of horses	Number of sheep	Number of swine	Value of all livestock
1850	1,101	1,584	1,278	59,426	5,984	$223,067
1860	1,319	1,513	1,399	40,620	3,309	282,439
1870	1,060	1,439	1,230	46,581	2,920	265,944
1880	1,484	1,845	1,318	45,734	4,295	240,227
1890	1,637	2,277	1,616	25,679	5,044	270,840
1900	1,794	2,320	1,498	20,043	3,500	285,352
1910	2,041	1,468	1,326	15,152	2,097	309,841

While changes in agriculture are evident from these reports, no marked increases have been made since the first census of the county in 1850.

INFLUENCE OF SIZE OF BUSINESS UPON PROFITS.

In tabulating and studying the records it has been noticeable that the farms making large labor incomes as well as those making large minus labor incomes are the farms with a large business. The size of the business is limited by the acreage except in the case of the specialized farm. The small general farm furnishes a living and a home for the family; but the opportunities for efficiency in utilizing labor, for growing a sufficient number of acres of crops, and keeping enough productive stock, are limited. The size of business may be measured in the following ways: acres in the farm, crop acres, animal units, labor units and gross income.

The average size of the 201 farms in Brooke County is 150 acres. The farms range from 12 acres, the smallest, to 488 acres, the largest. Two conditions make it impossible to get a good measure of the size of business from the number of acres in the farm. First, there is a considerable amount of unused land on some large farms; second, there are a number of small specialized farms doing a large business on a small area of ground. For this reason, tables showing the influence of acreage on labor income are of no value.

Crop Acres Related to Labor Income. Crop acres include the acreage in meadow, orchard, truck and all grain crops. The average number of crop acres per farm is 56.3.

TABLE I.—*Crop Acres Related to Labor Income, 192 Farms. (Truck Farms Excluded.)*

Crop Acres	Number of farms	Labor income
20 or less	23	$ 23
21 to 40	41	8
41 to 60	51	20
61 to 80	41	51
81 to 100	18	277
Over 100	18	616
Average, 56.3		**$104**

Table I shows the labor income of farms with 20 or less crop acres to be $23. While there are more crop acres in the next two groups of farms the labor income is smaller. These fall in the class of general farms with a small crop acreage. After the number of crop acres reaches 80 the labor income rises with additional crop acres. The group of farms with more than 100 crop acres has the largest labor income.

Man Labor Related to Labor Income. A labor unit rep-

resents approximately an average day's work. Some farmers have their work so organized that they can do an average day's work in less than a day.

TABLE II.—*Productive Man Labor Related to Labor Income, 201 Farms.*

Productive man labor units	Number of farms	Average number of man labor units	Labor income
100 or less	19	74	$129
101 to 200	45	151	−27
201 to 300	60	249	63
301 to 400	38	344	116
401 to 500	22	434	317
Over 500	17	647	526

It will be seen from the table that the group of farms with an average of 74 man labor units made $129 labor income. This group includes some of the farms which are producing for special markets. On the small farms there is not enough work to keep the men busy and they work off the farms thus adding directly to their labor income with practically no expense. The investment is also small and the interest charge is correspondingly low. A distinct increase in the labor income is noted in the group of farms with over 400 man labor units.

Gross Receipts Related to Labor Income. The gross receipts include all farm receipts. The increased inventory of farm property other than land is counted a farm receipt, but increases in land value are not considered.

TABLE III.—*Gross Income Related to Labor Income, 201 Farms.*

Gross income	Number of farms	Average gross income	Average labor income
Under $400	22	$ 256	−$197
401 to 800	41	575	−39
801 to 1200	45	993	1
1201 to 1600	35	1,384	114
1601 to 2000	19	1,791	166
2001 to 2400	11	2,223	163
2401 to 2800	9	2,633	430
2801 to 3200	5	2,924	534
Over 3200	14	4,807	1,281

The group of farms with less than $400 gross receipts has an average labor income of minus $197. In general there is a gradual rise in labor income as the gross receipts rise. In the group of farms with more than $3,200 gross receipts the labor income is $1,281; the chance of making this labor income is about 1 in 14.

The preceding tables show that there is a direct relation between the size of farm business and labor income. The size

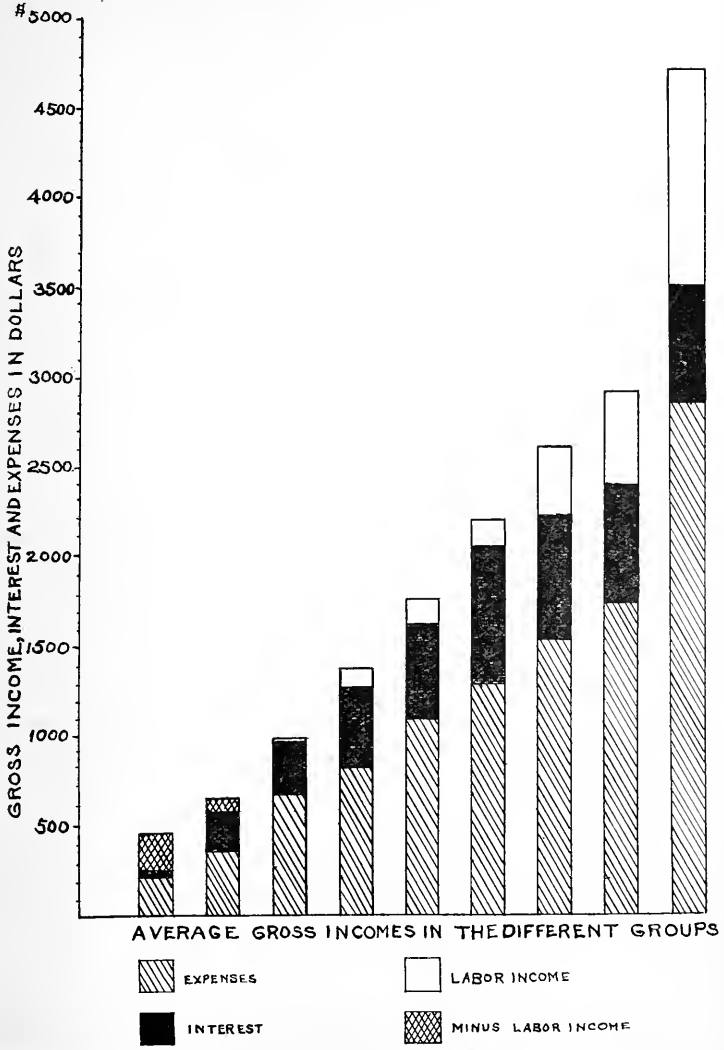


Diagram showing the distribution of gross incomes of different sizes among expenses, interest, and labor income.

of farm business is difficult to measure. Each of the three preceding tables measures a particular phase of it to some extent and they all show in a general way that labor income rises with an increase in the size of farm business. The seeming exception in the case of the groups having the smallest total number of acres, crop acres, man labor units and animal units is due to the fact that these farms with a small business get prices for their products which enable them to make fair labor incomes.

AMOUNT AND DISTRIBUTION OF CAPITAL.

Amount of Capital Invested. The type of farming is the chief factor in determining the amount and distribution of capital on farms with the same income. A profitable truck farm can be operated with much less capital than a general farm or a dairy farm having equivalent receipts.

TABLE IV.—*Family Income of Farms Classified According to Capital Invested.*

158 FARMS OPERATED BY OWNERS.

Capital	Number of farms	Average capital	Family income
Average of all farms		$10,764	$ 737
$ 5,000 or less	33	$ 3,558	$ 432
5,001 to 10,000	57	7,445	535
10,001 to 15,000	37	12,239	878
Over 15,000	31	22,777	1,262

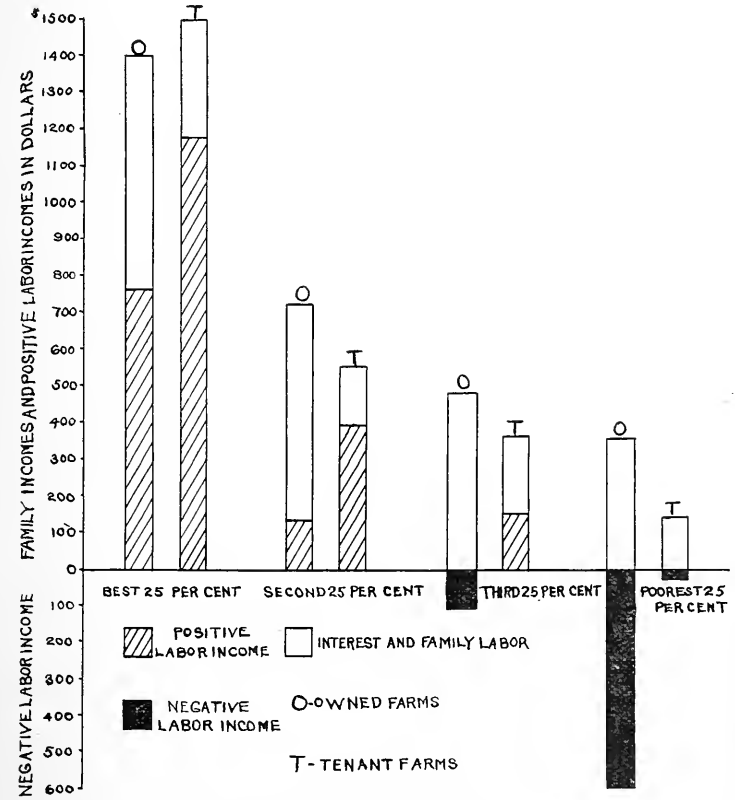
TABLE V.—*Family Income of Farms Classified According to Capital Invested.*

43 FARMS OPERATED BY TENANTS.

Capital	Number of farms	Average capital	Family income
Average of all farms		$1,399	$ 642
$1,000 or less	17	$ 704	$ 272
1,001 to 2,000	16	1,402	554
Over 2,000	10	2,577	1,410

Family income includes the value of family labor, interest on capital and labor income, and is the amount of money available for the family's living and the payment of interest on indebtedness. In so far as the family is concerned, net income is the important thing and in this discussion, the family is the unit rather than the farm operator. The distinction is clearly drawn in the case of farms operated by owners where the labor income is only $45 while the family income is $737. On the average tenant farm the labor income is $421 while the family income is $642 or about $100 less than on farms operated by owners. Interest on investment is deducted in figuring labor incomes; this interest on farms operated by owners is very much greater than on farms operated by tenants since the investment is much greater. The tenant has but little to live on except labor income and is, therefore, compelled to make a labor income; but the owner can live reasonably well without a high labor income, if he has a large investment, for

which reason he frequently does not strive to make a large labor income. In the group of farms with largest capital, which averages nearly $23,000, the labor income is minus $88, yet the family income is $1262. These men have an investment in farm property, the interest on which is making them a good living, and furnishes them a home even though they are really getting nothing from their labor.



Comparison of family incomes and labor incomes in four groups of farms operated by owners and tenants.

An additional reason for the larger labor income of the tenant is found in the fact that the rent paid amounts to only three percent on the investment in land. If the tenant were charged five percent on the value of the land as is the owner, the labor income of the tenant would be $239 instead of $421, while that of the owner is only $45. This difference is large enough to show a distinct advantage in favor of the tenant farmer.

The tenant's capital is much less than that of the owners operating their own farms. The farms operated by tenants show a rise in family income as the amount of capital increases. The tenants with over $2,000 capital are operating farms efficiently and making more than hired men's wages.

A recent investigation shows that the average contribution to the family living made by the farm in ten localities in the eastern part of the United States was $421.17 per family of 4.6 persons. This includes the value of food, fuel and the rent of the house and must be added to the labor income when farmers' incomes are compared to those of workers in town.*

Distribution of Capital. More than four-fifths of the total capital is invested in real estate. One who has but little capital can best begin farming as a tenant, since in this case the landlord furnishes the larger part of the capital.

TABLE VI.—*Distribution of Capital on Farms Operated by Owners and Tenants.*

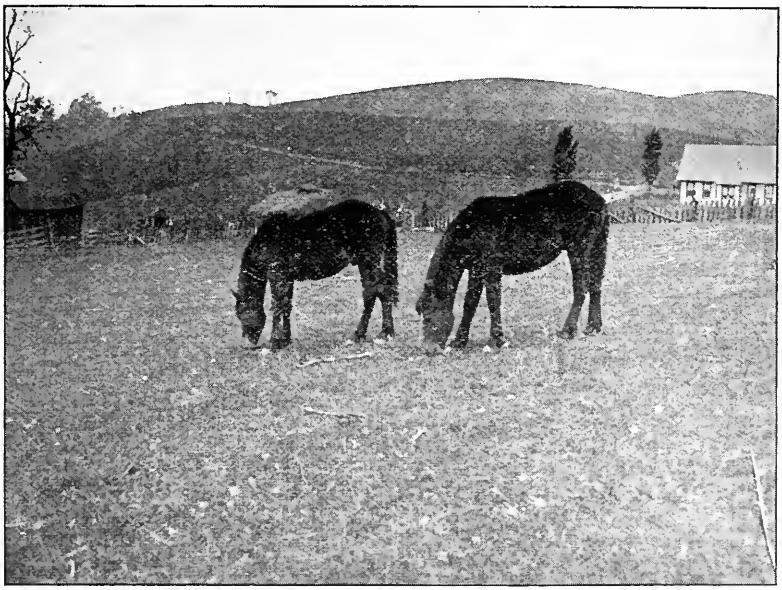
	158 farms operated by owners		43 farms operated by tenants		201 farms	
	Average capital	Percentage of total capital	Average capital	Percentage of total capital	Average capital	Percentage of total capital
Total capital	$10,764	100.00	$9,665	100.00	$10,507	100.00
Real estate	8,918	82.85	8,265*	85.51	8,757	83.35
Land	*6,126*	*56.91*	*6,212*	*64.27*	*6,119*	*58.23*
Buildings	*2,814*	*26.14*	*2,053*	*21.24*	*2,624*	*25.26*
Dwelling house	*1,809*	*16.81*	*1,238*	*12.81*	*1,618*	*16.00*
Livestock	1,386	12.88	1,091	11.29	1,323	12.59
Machinery and tools	326	3.03	227	2.35	305	2.90
Cash	97	.90	67	.69	80	.86
Feed and supplies	37	.34	15	.16	32	.30

*Landlord's capital.

Two points must be kept in mind in discussing capital used on the farm; first, the total amount and second, the distribution or the amount invested in different parts of the farm business. The farmer operating his own farm is using about $1,000 more than both tenant and landlord use on rented farms. A large part of this difference is in the buildings which are valued at $760 more on the farms operated by owners than on the rented farms. The difference in the value of the dwelling makes up the greater part of this. The investment in live stock and machinery is less on tenant farms than on those operated by owners. The percentages of total capital used for different purposes on farms operated by owners are

*U. S. Department of Agriculture—Farmers' Bulletin 635.

not strikingly different from the percentages used in the same way on tenant farms. The investment in real estate seems proportionally high. This may be partly due to high land values, however a number of the farms are not carrying as much stock as they could carry. One may have too much of the capital invested in real estate and not have sufficient capital left for operating the farm economically.



Raising colts to reduce the cost of horse labor.

TABLE VII—*Size of Farms Related to Capital Invested in Buildings, 201 Farms.*

Size of farms (Acres)	Number of farms	Average capital invested in dwelling house	Average capital invested in all buildings except dwelling house	Percentage of capital invested in all buildings
60 or less	26	$1,060	$ 465	44.0
61 to 120	57	1,382	788	31.9
121 to 180	58	1,843	955	26.1
181 to 240	29	1,910	1,150	22.3
Over 240	31	2,248	1,571	19.0

The farmers living on farms of 60 or less acres have 44 percent of the total capital invested in buildings; almost two-thirds of this is invested in the dwelling house. There is a general rise in the value of the dwelling house and other buildings as the acreage of farms increases. In the group of

farms with over 240 acres per farm there is but 19 percent of the capital invested in buildings and about three-fifths of this is invested in the dwelling house; still the dwelling house is worth more than twice as much as the dwelling in the group of smallest farms.

SOURCES AND DISTRIBUTION OF INCOME.

Profits and Number of Sources of Receipts. There are some advantages in having the income distributed among several sources and throughout the year. There is not likely to be a failure of several crops in a given year; prices of all crops are not likely to be low at one time; when crops are growing and ripening at different periods labor can be supplied without great difficulty; disease does not commonly attack all kinds of livestock at once, and one usually spends more wisely if his money comes in a little at a time rather than in a lump sum.

TABLE VIII.—*Profits on Farms Operated by Owners and Tenants Classified According to the Number of Sources of Income over $100.*

Number of sources of income over $100	158 farms operated by owners		43 farms operated by tenants		201 farms	
	Number of farms	Labor income	Number farms	Labor income	Number of farms	Labor income
1 or none	27	−$195	11	$ 98	38	−$110
2	48	−102	11	188	59	−48
3	31	−62	4	392	35	−10
4	24	156	8	454	32	230
5	18	417	4	1,006	22	524
6 or more	10	788	5	1,150	15	909

The labor income of the farms in the group with one or no source of income over $100, is the lowest of the various groups; the group with the largest number of sources has the largest labor income. This is true of all farms regardless of tenure. As the number of sources of income increases the labor income increases also. The increase in labor income is more rapid in passing from one group to the next when there are several sources of income over $100 than when there are but few.

Sources of Receipts. The farmers of Brooke County derive their incomes from the sale of crops, stock, stock pro-

ducts, and some miscellaneous receipts which are mostly for work off the farm.

TABLE IX.—*Distribution of Receipts on Farms Operated by Owners and Tenants.*

Sources of receipts	158 farms operated by owners		43 farms operated by tenants		201 farms	
	Receipts	Percent of total receipts	Receipts	Percent of total receipts	Receipts	Percent of total receipts
Total receipts	$1,467	100.00	$1,286	100.00	$1,427	100.00
Crops	$ 195	13.2	$ 249	19.4	$ 206	14.4
Livestock	368	25.0	299	23.3	353	24.7
Stock products	522	36.0	447	34.7	506	35.5
Miscellaneous	129	8.7	150	11.7	133	9.3
Increased inventory	253	17.1	141	10.9	229	16.1

The largest receipts comes from the sale of stock products and the next largest from the sale of livestock. Crop sales are not usually large.

Tenants receive a little more from crops than owners operating their own farms. The same is true as regards miscellaneous receipts. The small amount of stock on tenant farms accounts for the larger crop sales by tenants.

TYPES OF FARMS.

There are various ways of classifying farms as to type but for this discussion those having an enterprise yielding more than fifty percent of the gross receipts have been grouped together. On this basis there are 9 truck farms and 18 dairy farms among the 201 farms in Brooke County. There are a few other farms in the county which would fall into other types on the same basis but they are so few that a study of them would be unimportant for general averages.

Truck and Dairy Farms. There are several farms in the county selling a considerable amount of truck crops which do not fall into the class of truck farms since less than 50 percent of their receipts come from sales of truck. The same is true of farms selling dairy products.

TABLE X.—*Truck and Dairy Farms Compared.*

Factors	9 Truck farms	18 Dairy farms	201 Farms
Total capital per farm	$6,338	$12,966	$10,507
Acres in farm	83.2	167.0	150.0
Crop acres	32.1	62.1	55.2
Value of livestock	$491	$1,715	$1,323
Animal units	5.9	24.1	21.6
Value of machinery	$200	$403	$305
Labor units per man	114.0	175.0	151.0
Family labor per farm	$118	$214	$153
Family income	$894	$1,058	$716
Labor income	$567	$389	$125

Truck crops in the Ohio Valley.

Table X shows that on the truck farms capital, size of farm, crop acres, value of machinery and family labor are about half as much as the same factors on the dairy farms. All these factors are a little higher on the dairy farms than for the average of all the farms. There is about four times as much livestock on the dairy farms as on the truck farms, and about one-third more labor. The labor income of the truck farms is about one-third larger than the labor income of the dairy farms, and about four and one-half times as large as the average labor income on all the farms.

The opportunity for trucking is limited by both soil and markets. There is a considerable area adapted to trucking which is unused and no truck crops are shipped out. Local markets are not completely supplied. Dairy products can be produced in nearly all sections but the profitableness will be

limited in many cases by the bad roads which add much to the expense.

Farms Selling Milk, and Butter and Cream. Of the farms with six or more cows there are 14 selling milk and 64 selling butter or cream, or both.

A method of marketing dairy products.

TABLE XI.—*Farms Selling Market Milk Compared with Those Selling Butter and Cream.*

Factors	14 Farms selling market milk	64 Farms selling butter and cream
Capital per farm	$13,979.00	$12,390.00
Number of acres per farm	182.00	167.00
Number of cows per farm	16.50	10.10
Receipts per cow from milk and its products	$112.28	$65.18
Feed purchased per cow	22.64	13.72
Receipts per farm from crops	152.40	172.20
Crop index	90.10	107.90
Distance from market (miles)	3.20	4.40
Family labor per farm	$302.00	$189.25
Labor income	641.00	136.00

The farms selling market milk have more capital invested, larger farms and more cows than those selling butter and cream, and the receipts per cow are almost twice as great. The difference in the receipts per cow is largely due to the difference between the value of the product when sold as

market milk or butter. The farms selling butter and cream have much better crop yields and receive more from sales of crops than the farms selling milk. The farms selling milk are closer to market, have a larger amount of family labor, and are making a labor income more than four times as large as the farms selling butter and cream.

Receipts per Cow. On farms with less than four cows a large percentage of the milk is used by the family. The average receipts per cow on farms with four or more cows is $66; the average receipts on farms with twelve or more cows is $84.

FORMS OF TENANCY.

Cash and Share Rented Farms. Of the 201 farms studied there are 27 farms cash rented, 14 farms share rented, and 2 farms partly cash and partly share rented. A few farmers owned land and rented additional land but they are so few that they are not considered separately.

TABLE XII.—*Comparison of Farms of Different Tenure.*

	27 Cash rented farms	14 Share rented farms	43 farms operated by tenants	158 Farms operated by owners
Tenant's capital	$1,434	$1,291	$1,399	.....
Landlord's capital	8,613	7,661	8,265	$10,764
Acres in farm	147	186	159	148
Man labor units per farm	280	253	269	289
Productive labor units per man	154	155	155	150
Animal units per farm	18.4	20.0	18.8	22.3
Crop index	87.9	92.9	90.6	104.5
Cash rent per acre	$1.85	$2.75*	$2.29*	.....
Landlord's percentage on investment	2.2%	3.9%	2.8%	.....
Labor income	$445	$328	$421	$45

*Equivalent to cash rent.

There is but little difference in the factors on the farms rented for cash and those rented on shares. The crop index on all the rented farms is considerably lower than on the owned farms. The men who rent for cash get the use of the farms at almost a dollar less per acre than the farmers who rent on shares. The landlords who rent their land for a share of the crops are making a higher rate of interest than the landlords who rent for cash. The landlord's rate represents the percentage that his farm income forms of his capital. The tenants who rent for cash make $117 more labor income than the tenants who rent on the share basis.

TABLE XIII.—*Variation in Rent Received by Landlords on 41 Farms Operated by Tenants.*

Landlord's rent. Percentage on investment	Number of landlords	Percent of total number
1 or less	8	19.5
1.1 to 2	10	24.4
2.1 to 3	8	19.5
3.1 to 4	4	9.8
4.1 to 5	6	14.6
Over 5	5	12.2

None of the landlords are receiving a very high rate of interest on their investments. Of the 41 landlords, 18 receive 2 percent or less, and only five receive over 5 percent.

THE EFFECT OF ACREAGE ON DIFFERENT FACTORS OF PRODUCTION.

Efficiency in the Use of Labor. The farmers with a small acreage are handicapped in many of the farm operations as shown in the following tables. Almost as much machinery and motive power must be kept on hand for growing a few acres of crops as for several times as many. A large field can be worked much more economically than a small one.

TABLE XIV.—*Labor Efficiency of Farms Grouped According to the Number of Crop Acres.*

Crop acres	Number of farms	Number of work horses	Crop acres per work horse	Man equivalent	Crop acres per man	Val. of machinery per crop acre
20 or less	28	1.8	7.0	1.3	10.2	$10.39
21 to 40	42	2.5	12.2	1.6	19.6	5.99
41 to 60	52	3.5	14.5	1.9	27.0	5.63
61 to 80	43	4.4	16.0	2.1	34.3	5.12
81 to 100	18	5.4	16.3	2.4	36.7	5.28
Over 100	18	6.2	19.8	2.8	44.6	4.60

Each man and horse cares for a larger number of acres of crops on the farms growing the larger acreages of crops. The difference in the number of crop acres per work animal in groups of smallest and largest farms is 12.8 and the difference in crop acres per man is 34.4. The value of machinery per crop acre is $10.39 in the group of farms with twenty acres or less. In the group 21 to 40 acres the value of machinery per crop acre is $5.99. There is not a great change in the value of machinery per crop acre in the groups of farms with larger crop acreages.

Yields of Crops. About nine-tenths of the farmers grow corn and hay, about eight-tenths grow oats and about one-half grow wheat.

TABLE XV.—*Yields of Crops on Farms of Different Sizes.*

Size of farms (Acres)	CORN		OATS		WHEAT		HAY	
	Number of farms	Bushels per acre	Number of farms	Bushels per acre	Number of farms	Bushels per acre	Number of farms	Tons per acre
Average		42.0		28.3		12.0		1.00
30 or less	7	44.0	2	9.8	....	.....	5	1.20
31 to 50	7	39.6	5	17.8	2	10.0	7	1.10
51 to 100	41	35.8	30	22.5	14	15.2	42	1.00
101 to 150	42	40.7	41	25.8	22	11.2	41	.98
151 to 200	43	41.0	42	29.6	30	12.3	45	1.00
Over 200	43	44.3	42	30.8	37	12.0	43	1.00

The old method of using the corn crop.

There seems to be no direct relation between size of farms and crop yields except in the case of oats which shows a gradual increase in yield as the number of crop acres increases.

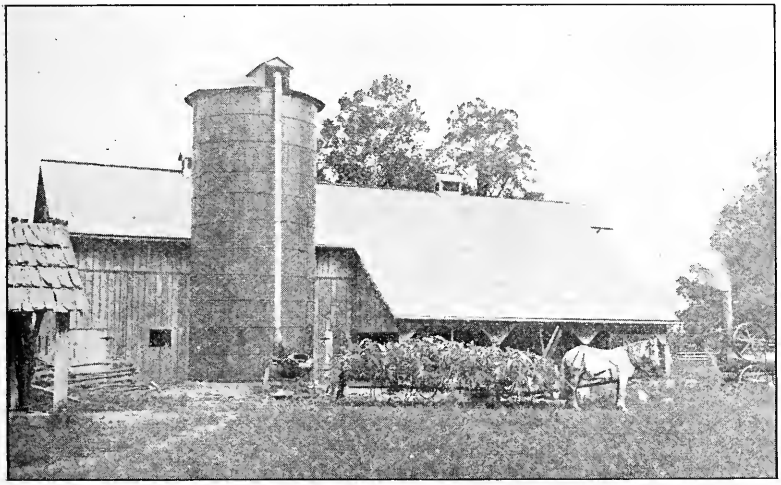
Expenditure of Labor. Some types of farming require much more labor per acre than other types, however, labor can be more economically used on large general farms properly organized than on small farms of the same type.

Intensity of Livestock Production. An animal unit represents one horse, cow or the equivalent, based upon the amount of feed eaten.

TABLE XVI.—*Relation Between the Amount of Livestock kept per 100 Acres of Pasture and Crop Land, and Labor Income. 192 Farms.*

Number of farms in group	Number of animal units per 100 acres of crop and pasture land	Average number of animal units per 100 acres of crop and pasture land	Labor income
34	10 or less	6.5	$ 2
53	11 to 15	13.2	18
49	16 to 20	17.8	120
33	21 to 25	22.5	169
23	Over 25	32.3	328

The amount of livestock to be kept on a given area of land is determined by many factors, such as productivity of soil, relative value of crops and stock, and amount of labor avail-



The new way; increasing in popularity.

able. In this study truck farms have been omitted since livestock is not a large factor in that business. The farmers who have farms in condition to carry a reasonable amount of stock are making larger labor incomes than those who can keep only a few head on an equal area of crop and pasture land. Table XVI shows clearly that it pays to have land in condition to carry more stock than many farms now carry. The labor income increases in each group of farms from those having ten or less animal units per hundred acres of crops and pasture up to those having twenty-five or more animal units on the same area.

LAMB PRODUCTION.

Fine-wool sheep—Merinos and Delaines—are practically the only breeds grown in Brooke County. Wool production has been one of the leading industries for many years. Since the price of wool has become very low, fine wool sheep are not so profitable as formerly. The fleeces average 6.8 pounds; the price this year averaged 23.5 cents per pound.

A profitable method of using pasture some distance from market.

TABLE XVII.—*Lamb Production on Farms with Different Numbers of Ewes.*

Ewes per farm	Number of farms	Average number of ewes per farm	Number of farms reporting lambs	Average number of lambs per ewe
50 or less	28	26	21	.38
51 to 100	22	71	19	.35
Over 100	16	140	14	.29

From Table XVII it will be seen that some of the farmers raise no lambs at all some years. Of 66 farmers who kept ewes but no wethers, 12 report no lambs. The farmers who grow lambs are not attempting to grow very many. The average is about one-third of a lamb per ewe.

EGG PRODUCTION.

Almost all farms in Brooke County grow some chickens and sell some eggs; many of them sell both chickens and eggs.

TABLE XVIII.—*Production and Value of Eggs and Chickens on Farms Having Different Numbers of Hens.*

Number of hens per farm	Number of farms	Average number of hens per farm	Receipts for eggs	Receipts for chickens	Total receipts per hen
50 or less	62	39.6	$ 36.25	$17.76	$1.36
51 to 100	102	80.8	81.94	26.80	1.36
Over 100	34	164.0	163.44	53.97	1.33

The receipts for eggs are nearly three times as great as the receipts from sales of chickens. The receipts from both eggs and chickens are in proportion, in a general way, to the number of chickens kept. The receipts per hen are practically the same in the flocks of different sizes.

FARMS WITH OVER $500 LABOR INCOME.

Thirty-eight farmers made over $500 labor income; of these, 14 were tenants and 24 owners. About one farmer in each five is making a labor income of $500 or more. Three farmers make over $2,000 labor income.

AGE OF FARMERS.

The average age of the 201 farmers is 50 years. The tenants average about 10 years younger than the owners who are operating farms. Young men are generally making better labor incomes than older men, many of whom have retired from active work.

SUMMARY.

The results of this survey show what may be expected from farming under conditions similar to those in Brooke County. The average labor income of the 201 farms is $125. In addition to this the farm has furnished a home for the family and products for the table such as milk, butter, eggs, vegetables, and meats. To be a business success a farm must pay all expenses, interest on the investment and wages for all labor performed by the farmer and his family; but a farm may be a success when it furnishes a home and a living, and gives pleasure to the owner.

Size of Business. We have seen that when labor income is compared with magnitude of business, when the latter is measured either by the area in crops, by the amount of productive man labor, or the gross income, the labor income increases materially as the magnitude of the farm business increases. By comparing amount of working capital with labor income we get a similar result. In order to secure an income that will permit a satisfactory standard of living, the farm business must be of considerable size. Where the situation permits very intensive farming, such as trucking, fruit growing, etc., a large business may be conducted on a few acres; but where the conditions are such as to require general farming, as most kinds of livestock farming, the acreage must be larger. A farmer with a very small acreage who cannot engage in intensive farming because of a lack of markets for the products would find it to his advantage to rent additional land or, in some cases, to sell his small farm and invest his capital in the necessary work stock and implements to farm a larger area and become a tenant on a farm of sufficient size to give an opportunity to earn a good income.

Capital. There is a close relation between the amount of capital invested and the family income, but on many farms where the capital is large, organization is poor and there is no income for labor.

Diversity. Diversified farming offers the best opportunities when carried on with a large business. The labor income rises as the number of sources of income increases as shown in Table VIII. Diversity in general farming is very important as it insures a more nearly uniform income from year to year. It also affords an opportunity for utilizing labor and machinery economically.

Types. Most of the farms of Brooke County are classed as general farms and have different problems from the specialized ones. Truck and dairy farms are the two specialized types most common and both are generally successful. A combination of enterprises including dairy, truck, fruit or general crop farming organized to suit individual needs seems to be most desirable. Only a small part of the area adapted to growing truck crops is utilized for that purpose at present. While there are but few large orchards, fruit of an excellent quality can be grown throughout the county. The production of dairy products need be limited by the market only. Corn for grain is giving way to silage corn and alfalfa is increasing in acreage very rapidly.

Livestock. While there is a great variation in the production of dairy cows on different farms, there is no striking difference in production in the groups of farms of different sizes nor in the small and large herds. The form in which the product is marketed has a considerable influence on the value of the product per cow—market milk paying best. Beef cattle are not raised in any considerable numbers. Fine-wool sheep—Delaines and Merinos—are grown almost exclusively. The size of the flock has but little influence on the production per ewe. Almost every farm has a flock of chickens. The production per hen is about the same in different sized flocks.

Tenure. The labor income on farms operated by tenants is larger than on farms operated by owners, but the tenant's capital is small and his income available for use of the family is smaller than that of the owner operating his own farm. Share renting usually gives the owner a larger return on his investment than cash rental.

Opportunities and Suggestions. A farm which gives a labor income of $500 in addition to furnishing a home and a large part of the living is a good business. While the number making this labor income is not large, about twenty percent, indications are that opportunities are open for farmers on well organized farms in this county.

Since truck and dairy farming are the most profitable types and a rather large area is available which is adapted to these industries, they can be materially increased. Markets for the products will be the first limitation. So far as can be seen now there is little danger of over supplying the markets that can be reached.

The farms some distance from the railroads or trolley lines can produce butter at a profit if good producing cows are kept, and in addition many of these farmers would find it profitable to gradually develop purebred herds from which they might sell surplus stock.

General farming is profitabe only when conducted on a large scale. The size of business may be increased by intensifying the culture or by increasing the area of the farm. The area can be extended by buying or renting additional land.

Brooke County is admirably adapted to sheep grazing. A few of the farmers have found it profitable to cross the fine-wool ewes with mutton type sires, thus producing market lambs in addition to wool. In any case it is highly desirable to produce a larger number of lambs from the ewes. The production on the average of one-third of a lamb per ewe is certainly unprofitable with present prices for mutton. (Table XVII).

Poultry is produced on almost every farm and in most cases could be profitably grown in greater numbers. The returns per hen indicate that better care of the poultry would be profitable (Table XVIII). For the man with small capital, tenant farming seems advisable. One should have enough money on hand to operate the farm economically. This year (1914) cash rental paid better for the tenant than the landlord; with poorer crops, share rental might pay better. There are some farmers in each group of farms who are making a success of their farming. This indicates that organization and management as well as the type of farm are of great importance.